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CONTRIBUTIONS TOWARD A RECLASSIFICATION OF THE FORMICIDAE

I. *Tribe Platythyreini (Hymenoptera)*

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The tribe *Platythyreini* has included the sole genus *Platythyrea* Roger as treated by former authors. My own investigations show that three additional genera (*Probolomyrmex*, *Escherichia* and *Eubothroponea*) must be included. *Probolomyrmex* Mayr and *Escherichia* Forel have heretofore been placed among the *Proceratiini* because of their depigmented condition, atrophied eyes (workers), and especially their vertical, fused and approximated frontal carinae and the closeness of the antennal insertions to the median line and to one another, accompanied by fusion of frontal carinae with the greatly crowded clypeus. Also, these two genera have, according to the describers of the included species, only one tibial spur to each of the two posterior pairs of tibiae. I believe that all of the characters just mentioned are correlated with adaptation of the insects to hypogaecic or other cryptobiotic conditions of life; they appear in widely separated genera of ants and other hymenopters, such as *Proceratium*, *Discothyrea* and others in the Formicidae, *Psilobethylus*, etc. in the Bethyilidae, and so on, as rather consistent combinations. The similar modifications of doryline and some other ants may be partly due to hypogaecic or subhypogaecic adaptation, but it would seem that the legionary habit may somehow be more important in accounting for this particular structural modification.

For our present purposes, it will be sufficient merely to recognize two facts: (1) the characters combining to produce the "proceratiine

habitus" can and do act to form similar-appearing groups of genera, even though these genera may have the most diverse ancestry; (2) the number and condition of the spurs of the two posterior pairs of tibiae have been found to possess much less taxonomic value than Emery and Wheeler granted in their widely-used keys; in fact, the spurs are now known to be present as pairs, single units, or even to be absent in different species of the same genera in tribes where once the spurs were considered universally constant and tribally diagnostic.

With these facts in mind, one can proceed at once to a more natural classification of the genera and tribes of Ponerinae. *Probolomyrmex* and *Escherichia* have always seemed anomalous as members of the Proceratiini, and they are not, in fact, at all closely related to any other proceratiine genus. Following a slight clue dropped by Mann in 1923, when he mentioned the similarity of the pilosity and sculpture between his *Probolomyrmex boliviensis* and the species of *Platythyrea*, I have carefully compared the two last-named genera and find that they agree in an astoundingly complete way. In fact, the point-by-point agreement is so close that I must consider *Probolomyrmex* to represent a direct derivative of *Platythyrea* modified for a highly cryptobiotic existence in the same way, as I also believe, that the proceratiines are only modified ectatommines. If *Platythyrea* and *Probolomyrmex* are to be associated, then *Escherichia* should probably go along with them. While I have never seen an example of the latter genus, it appears from all accounts to be very close to *Probolomyrmex*, and may even be synonymous and representative of an ergatoid or other intermediate female caste of one of the Ethiopian *Probolomyrmex* species.

A fourth genus that must be included in the Platythyreini is *Eubothroponera*, in spite of its unfortunate name. In his original diagnosis of this Australian group, Clark stated, "... certainly close to *Bothroponera* Mayr;" he called the tarsal claws "simple" and gave the palpal formula as maxillary 4, labial 2 segments. I have examined types (Museum of Comparative Zoology) of all the *Eubothroponera* species described to date except *E. brunnipes* Clark, and find that all species, at least in the worker caste, possess single, small but distinct median teeth on all tarsal claws. The palpi in this genus are unusually long for a ponerine group, and the maxillary pair may reach the foraminal border behind if fully outstretched. Most of the few specimens available were inconveniently situated or else had the maxillae retracted, but in spite of this it is clear that all six species seen have more of both maxillary and labial palpal segments than Clark claims

for them. In *E. reticulata* Clark and *E. tasmaniensis* (Forel), a full count was made under good conditions, and in these species the formula was maxillary palpi 6, labial palpi 4 segments. The basal segment, especially in the maxillary palpus, is short, fairly broad, and the segment most likely to be overlooked. Comparing the proportions of the visible segments of the palpi of the less favorably situated specimens with those upon which a direct count could be made, I feel quite safe in assuming that the six species I have seen all possess a 6, 4 formula in the worker.

Now this formula is the primitive one in *Platythyrea*, as I can confirm (*vide infra*), and since all other characters save one combine to link the two genera, they must at least be placed in the same tribe. In fact, the characters separating them are relatively minor ones, though constant and consistent in combination in the series before me. The body in *Eubothroponera* is smaller and generally more compact (less slender and elongate), and the characteristic sculpture of *Platythyrea* is less well developed in *Eubothroponera*, but still basically the same on head and alitrunk. The pilosity must be used to separate the two genera until a study can be made including all castes of a large number of species belonging to both (see key, below).

In examining the palpi of some representative species of *Platythyrea* for this work, it was confirmed, as has been long known, that certain of them have a palpal formula of 6, 4. What is not so generally known, or perhaps even unknown until now, is that certain species of the Old World tropics possess lesser numbers of segments. The New World species *P. angusta* Forel and *P. strenua* Wheeler and Mann have elongate palpi, with the 6, 4 segmentation; the basal segment, particularly of the maxillary palpi, is very short, and the total similarity of the palpi to those of *Eubothroponera* is very striking. Among the Old World forms, *P. cribrinodis* (Gerstaecker) very definitely has short palpi, formula 3, 2. In *P. schultzei* Forel, the maxillary palpi have 2 clearly visible segments each, and there may possibly be a third small basal one, though no third segment could be seen in the single specimen examined; the labial palpi are definitely 2-segmented. Other species, such as *P. sagei* Forel, were not advantageously placed for a definite palpal count, but had short palpi with formulae almost certainly under those of *angusta* for both pairs. Also seen in one doubtfully determined species from the Old World were palpi with definite counts of 6 and 4, but very short in overall proportions. It seems that *Platythyrea* species vary considerably from one to the next in palpal characters, and anyone possessing the material needed for a thorough survey of

the group by means of dissection may be able to correlate this variation with other characters, and thereby be able to recognize more than one group or genus among the array of *Platythyrea* species.

Furthermore, the males of *Platythyrea* seem, from external examination only, to have very distinctive terminalia worthy of further study.

*Key to the genera of the tribe Platythyreini, based on the workers
and probably applicable to the females*

1. Frontal carinae and clypeus fused and projecting anteriorly over the mandibles; antennae somewhat incrassate apically, inserted close together on the anterior part of the clypeo-carinal process. (Small, usually pale-colored forms, under 4 mm. in length. Ethiopian, Neotropical, Indo-Australian).....*Probolomyrmex* Mayr¹
Escherichia Forel
- Frontal carinae and clypeus not projecting anteriorly over mandibles; antennae inserted distinctly posterior to the clypeus and apart from one another, the insertions covered by the broad lobes of the frontal carinae, funiculus not or scarcely incrassate in most forms. (Larger, usually pigmented forms, mostly over 4 mm. in length).....2
2. Distinct erect pilosity present and widely distributed (widespread in Australia).....*Eubothroponera* Clark
- Distinct erect pilosity limited to mouthparts and gastric apex. (Tropico-politan; occurring naturally or as tramp species in some warm temperate regions).....*Platythyrea* Roger

Below are listed the platythyreine genera as known to me at present, and also a citation of the genotypes and the principal references to the literature. The references are not intended to be complete, but are designed to give the interested worker a start toward the gathering of pertinent titles.

PLATYTHYREA Roger

1863, Berlin. Ent. Zeitschr., 7: 172. Genotype: *Pachycondyla punctata* Fred. Smith, 1858, soldier (*recte* worker), male; designated by Bingham, 1903.

Besides the characters cited in the key (above), it should be mentioned that this genus, and also *Eubothroponera*, are further marked by

¹ *Probolomyrmex* and *Escherichia* are supposed to differ in that the latter has small compound eyes and a discernible postmesonotal groove or line, but it is important to note that Forel himself, in the original description of *Escherichia*, compared the novelty with several proceratine genera, but made no mention of *Probolomyrmex*! Certain *Probolomyrmex* (*P. boliviensis* Mann, *P. parvus* Weber) are known only from the female caste.

having a complete and apparently functionally flexible suture separating the pro- and mesonotum, and also by having a large and a smaller spur on each one of the two posterior pairs of tibiae.

Emery's survey of the world species (1911, Gen. Ins., Fasc. 118, pp. 28-30) is comprehensive for its time, but is now far out of date due to the addition of many forms since it was written. Wheeler's "Ants of the Belgian Congo" (1922, Bull. Amer. Mus. Nat. Hist., 45: 57-60, 758-761, 1007) gives references to African and Malagasy species.

EUBOTHROPONERA Clark

1930, Proc. R. Soc. Victoria, Melbourne, (n.s.) 43: 8-9. *Genotype: Eubothronponera dentinodis* Clark, 1930, worker; original designation, *nec E. tasmaniensis* (Forel) designated by Clark in 1934.

With the original generic description, Clark characterized and figured three species (pp. 9-11, fig. 1): *E. dentinodis* Clark (p. 9, fig. 1, nos. 6, 6a); *E. micans* Clark (p. 10, fig. 1, nos. 7, 7a); *E. bicolor* Clark (p. 11, fig. 1, nos. 8, 8a); he also included in the genus Forel's *Pachycondyla* (*Bothroponera*) *tasmaniensis* (p. 11), and gave a "key" (p. 9) to the three Western Australian species newly described.

In 1934 (Mem. Nat. Mus., Melbourne, No. 8, pp. 32-34, pl. 2, figs. 15-17) Clark redescribed the worker of *E. tasmaniensis* (Forel) (p. 32, fig. 15) from Tasmania and described the new species *E. reticulata* (p. 33, fig. 16) from New South Wales and *E. septentrionalis* (p. 34, fig. 17) from Queensland.

A seventh and last species was added by Clark when he described *E. brunnipes* (1938, Proc. R. Soc. Victoria, Melbourne, 50: 361-362, fig. 3) from Reevesby Island, Sir Joseph Banks Group, South Australia (biology, *loc. cit.*, p. 356).

The above, I think, includes all the recognized species of *Eubothronponera*, each reported only from the worker caste. The species are quite uniform in structure, and it is felt that Clark has failed in some instances to properly differentiate them; consequently, a review of the genus is necessary.

PROBOLOMYRMEX Mayr

1901, Ann. Naturhist. Hofmus. Wien, **16**: 2-3. Genotype: *Probolomyrmex filiformis* Mayr, 1901, worker; monobasic.

M. R. Smith (1949, Proc. Ent. Soc. Washington, **51**: 38-40) has reviewed briefly the five species known to that date. A sixth species was described at about the same time by Weber (*P. parvus* Weber, 1949, Amer. Mus. Novit., No. 1398, pp. 3-4, fig. 2, female) from Africa. A description with a good habitus drawing of the female type of *P. boliviensis* is given in the original reference by Mann (1923, Psyche, **30**: 16-18, fig. 2). A seventh species, apparently remaining undescribed, has been taken in the Canberra region of eastern Australia by Mr. Tom Greaves.

ESCHERICHIA Forel

1910, Zool. Jahrb. Syst., **29**: 245-246. Genotype: *Escherichia brevisrostris* Forel, 1910, *op. cit.*, pp. 246-247, worker; monobasic.

Although there are entries in the catalogs of Emery and Wheeler, this genus and species seems not to have been reported a second time. It should be noted, however, that Weber's description of *Probolomyrmex parvus*, cited above, may just possibly apply to the female of *Escherichia brevisrostris* when the latter becomes known in association with workers, as the characters and type localities given for the two species do not, to my mind, exclude the possibility of conspecificity.